Comparison of castile soap, benzalkonium chloride, and bacitracin as irrigation solutions for complex contaminated orthopaedic wounds.

Conroy BP, Anglen JO, Simpson WA, Christensen G, Phaup G, Yeager R, Gainor BJ.

Department of Orthopaedic Surgery, The University of Missouri-Columbia, USA.

OBJECTIVE: The purpose of the present study was to determine the effects of cleaning a contaminated orthopaedic wound with different classes of wound irrigation solutions. STUDY DESIGN: Rats with a contaminated orthopaedic wound were randomized into treatment groups: normal saline (NS), castile soap (CS), benzalkonium chloride (BzC), bacitracin (Abx), or sequential irrigation with BzC, CS, and NS. INTERVENTION: Pseudomonas aeruginosa [P. aeruginosa; 1 x 10(6) colony-forming units (CFU)], or Staphylococcus aureus (S. aureus; 1 x 10(6) CFU) were placed into a paravertebral wound (containing a wire implant placed through a spinous process) and allowed to incubate for fifteen minutes. The wound was then irrigated with three liters of either NS, 0.05 percent CS, 0.03 percent BzC, Abx (33,000 units per liter) or underwent a sequential irrigation treatment (one liter each of BzC, CS, NS). MAIN OUTCOME MEASUREMENTS: The animals were observed daily for wound complications for fourteen days and then killed, and cultures of the wound were obtained. RESULTS: Pseudomonas aeruginosa: Both CS and the sequential irrigation treatment significantly lowered the rate of positive wound cultures when compared with NS ($p < 0.05$). Irrigation with BzC resulted in a higher rate of positive wound cultures and complications. The sequential irrigation treatment prevented the wound complications associated with irrigation with BzC alone. Staphylococcus aureus: Only BzC irrigation significantly lowered the rate of positive wound cultures when compared with NS ($p < 0.05$). CONCLUSION: The rate of positive wound cultures due to P. aeruginosa is effectively reduced by irrigation with CS alone or by the sequential irrigation treatment. When used alone, the antiseptic BzC results in a higher rate of positive wound cultures and wound complications. The wound complications seen with irrigation with BzC alone are prevented by the sequential irrigation treatment (BzC followed by CS and NS). The rate of positive wound cultures in this model due to S. aureus is not decreased by irrigation with CS; however, the rate of positive wound cultures is safely and effectively decreased with the use of BzC.

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